



TITLE OF THE INVENTION

INFORMATION PROCESSOR HAVING ELECTRONIC MAIL FUNCTION
AND RECORDING MEDIUM STORING ELECTRONIC MAIL PROCESSING
PROGRAM

RECEIVED

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BACKGROUND OF THE INVENTION

[0001] The present invention relates to an information processor having an electronic mail function and to a recording medium storing an electronic mail processing program.

[0002] The sending and receiving of a file or the like between a plurality of information processors is performed by attaching the file to the text of an electronic mail message using an electronic mail system connected to a public communication line or a network.

[0003] However, there are problems with this type of communication in that, since the size of an electronic mail message is increased greatly when a large sized file is attached thereto, such as an image data file, for example, the remaining capacity of the mail server is largely decreased, which greatly hinders the receipt of additional electronic mail. Also, since a large volume of data is carried on the communication line when such a large file is sent, the performance of the communication line, particularly an analogue communication line, is degraded during such a transmission.

[0004] In order to solve these problems, some mail servers that set a limit (an upper limit) to the size of data which may be sent or received by electronic mail, such that electronic mail having a size exceeding this limit is not handled, or electronic mail

having a size exceeding a preset size is not immediately sent, but is sent at a time when the communication line is not busy.

[0005] However, in the case of a mail server which places a limitation on the size of mail which it will handle, since a large-sized file can not be attached to electronic mail handled by that mail server, it is necessary to send and receive the file using another means. Therefore, there is a limitation on the effective use of the electronic mail.

[0006] On the other hand, in the case of a mail server which controls the sending and receiving of electronic mail by controlling the transmission time, since it is impossible to send and receive electronic mail without a delay, a file can not be sent or received at an appropriate or desirable time. Therefore, the working efficiency of tasks using the file is degraded.

[0007] A user can send electronic mail by dividing a file to be sent into small-sized files and attaching each of the divided files to a separate electronic mail message. However, since the work to divide the file to be sent and the work to send the file by attaching each of the divided files to each of the plural electronic mail messages are necessary, the work involved in sending the file by the user becomes complicated. Further, since the receiver of the mail is required to reconstitute the plural divided files attached to the plural electronic mail messages to reconstitute the single original file, the work in receiving the file becomes complicated.

SUMMARY OF THE INVENTION

[0008] An object of the present invention is to provide an information processor having an electronic mail function which can easily attach a large-sized file to

an electronic mail message, and send or receive it, and to provide a recording medium storing an electronic mail processing program for the information processor.

[0009] The present invention is characterized by an information processor having an electronic mail function, which comprises a mail size upper limit value storing means for storing at least one upper limit value of a sending destination mail size; a mail size comparing means for comparing the upper limit value stored in the mail size upper limit value storing means with a size of the main part of mail to be sent; a mail dividing means for dividing the mail to be sent into a plurality of sub-mail sections when the size of the mail exceeds the mail size upper limit value; and a mail sending means for sequentially sending sets of information individually including the divided sub-mail sections.

[0010] Further, the present invention is characterized by an information processor having an electronic mail function, which further comprises a destination-based information registration database in which data is registered, the data being destination-based information including whether or not a mail address, a mail upper limit value and a divided mail reconstituting program for reconstituting a plurality of divided sub-mail sections to form the original mail exist at each destination.

[0011] Further, the present invention is characterized by an information processor having an electronic mail function, which further comprises means for setting data into the destination-based information registration database, the data being information to be used in judging whether or not there is necessity for attaching a reconstituting program to divided mail to be sent.

[0012] Further, the present invention is characterized by an information

processor having an electronic mail function, which further comprises a mail dividing information adding means for adding mail dividing information, which is necessary for reconstituting a plurality of divided sub-mail sections to obtain the original mail form, to each of the sets of information.

[0013] Further, the present invention is characterized by an information processor having an electronic mail function, wherein the mail dividing information attached to each of the sub-mail sections includes an identification code for identifying the original mail, sub-numbers for identifying the order of the sub-mail sections, a total number of mail sections, and the capacity of each of the sub-mail sections.

[0014] Further, the present invention is characterized by an information processor having an electronic mail function, wherein the reconstituting program is a program for reconstituting the original mail based on all the received sub-mail sections and the mail dividing information attached to each of the sub-mail sections.

[0015] Further, the present invention is characterized by an information processor having an electronic mail function, which further comprises a means for automatically attaching a divided mail reconstituting program to sent mail when it is judged that the mail destination does not have a divided mail reconstituting program.

[0016] Further, the present invention is characterized by an information processor having an electronic mail function, wherein the mail size upper limit value storing means comprises a mail size upper limit value storing part and a mail size upper limit value input means for inputting a mail size upper limit value for each destination, the mail size upper limit value being stored in the mail size upper limit value storing part.

[0017] Further, the present invention is characterized by an information

processor having an electronic mail function, wherein the mail size upper limit value storing means further comprises a mail size upper limit value switching means for switching a mail size upper limit value used by the mail size comparing means corresponding to a mail destination.

[0018] Further, the present invention is characterized by an information processor having an electronic mail function, which further comprises means for setting a subject name for each of the divided sub-mail sections, the subject name being the name of the original mail, to which is added data corresponding to the total number of divided sections and the order of the sub-mail sections.

[0019] Further, the present invention is characterized by an information processor having an electronic mail function, wherein it is displayed on a display unit of the information processor that divided mail is being sent.

[0020] Further, the present invention is characterized by an information processor having an electronic mail function, wherein the number of divided mail sections is set so as to be minimized.

[0021] Further, the present invention is characterized by an information processor having an electronic mail function, wherein the number of divided sections is set so as to equalize the capacities of the divided sub-mail sections.

[0022] Furthermore, the present invention is characterized by an information processor having an electronic mail function, which comprises a mail dividing judging means for judging whether or not mail dividing information is appended to received mail data; a divided-mail receiving judging means for judging, by referring to the mail dividing information, whether or not all of the divided sub-mail sections of a

divided mail message have been received; and a mail reconstituting means for reconstituting the received sections of sub-mail data to a form of a single original item of mail data.

[0023] Further, the present invention is characterized by an information processor having an electronic mail function, wherein it is displayed on a display unit of the information processor that divided mail is being received.

[0024] Furthermore, the present invention is characterized by a method of sending and receiving electronic mail, the method comprising the steps of accepting a request for sending mail; acquiring a mail size upper limit value of a destination based on an address of the mail destination; comparing the size of the mail to be sent with the mail size upper limit value of the mail destination; directly sending the mail to be sent when the size of the mail to be sent is smaller than the mail size upper limit value of the destination; dividing the mail to be sent into sub-mail sections according to an appropriate dividing method and attaching dividing information to each of the sub-mail sections, when the size of the mail to be sent is larger than the mail size upper limit value of the mail destination; attaching a reconstituting program to the divided mail sections when a reconstituting program is not provided at the mail destination; and sending the divided mail sections.

[0025] Further, the present invention is characterized by the method of sending and receiving electronic mail, wherein, when the mail to be sent is divisionally sent, it is displayed on a display unit that the mail is divisionally sent.

[0026] Furthermore, the present invention is characterized by a method of sending and receiving electronic mail, the method comprising the steps of judging

whether or not received mail is being divisionally sent; after receiving all divided sub-mail sections, reconstituting the received sub-mail sections to obtain the mail as it existed before being divided using a reconstituting program and dividing information attached to each of the divided mail sections when the received mail is being divisionally sent; and executing normal receiving processing when the received mail is not being divisionally sent.

[0027] Further, the present invention is characterized by a method of sending and receiving electronic mail, wherein when the received mail is being divisionally sent, it is displayed on a display unit that the mail is being divisionally sent.

[0028] Furthermore, the present invention is characterized by a recording medium storing an electronic mail processing program for realizing an electronic mail function by loading the electronic mail processing program into an information processor, wherein the electronic mail processing program includes a program for executing a processing for comparing an upper limit value of a sent mail size with the size of mail to be sent; and a processing for sending the mail by automatically dividing mail data to be sent into a plurality of sub-mail sections when the size of the mail to be sent exceeds the upper limit value of a sent mail size.

[0029] Further, the present invention is characterized by a recording medium storing an electronic mail processing program, which further includes a program for executing mail dividing information adding processing for adding information to sent mail data, the information being necessary for reconstituting divided items of divisional sub-mail data to obtain a single original item of mail data.

[0030] Further, the present invention is characterized by a recording

medium storing an electronic mail processing program, which further includes a program for executing a processing for attaching a reconstituting program for reconstituting divided items of divisional sub-mail data to obtain a single original item of mail data; and a processing for setting into a destination database information indicating whether or not the attaching of the reconstituting program is necessary.

[0031] Further, the present invention is characterized by a recording medium storing an electronic mail processing program, which further includes a program for executing a mail size upper limit value setting processing for setting an upper limit value of a sent mail size; and a mail size upper limit value storing processing for storing the upper limit value of a sent mail size set in the mail size upper limit value setting processing in a destination database of an information processor.

[0032] Further, the present invention is characterized by the recording medium storing an electronic mail processing program, which further includes a program for executing a processing for switching the upper limit value of a mail size with reference to the destination database corresponding to a mail destination.

[0033] Further, the present invention is characterized by a recording medium storing an electronic mail processing program, which further includes a program for executing a processing for automatically changing a subject name of each of the items of divided mail data to include an identification of the number of divided sections and the order of division of each of the items of divided mail data.

[0034] Furthermore, the present invention is characterized by a recording medium storing an electronic mail processing program for realizing an electronic mail function by loading the electronic mail processing program into an information

processor, wherein the electronic mail processing program includes a program for executing a mail dividing information judging processing for judging whether or not mail dividing information is attached to received mail data; divided mail receiving judging processing for judging, based on the mail dividing information, whether or not all necessary items of divided sent sub-mail data have been received; and mail reconstituting processing for reconstituting the received plurality of items of divided sub-mail data to obtain a single original item of mail data.

BRIEF DESCRIPTION OF DRAWINGS

[0035] FIG. 1 is a block diagram showing an embodiment of an information processor having an electronic mail function in accordance with the present invention.

[0036] FIG. 2 is a functional block diagram showing means realized by executing an electronic mail processing program for sending electronic mail using a CPU in an information processor having an electric mail function in accordance with the present invention.

[0037] FIG. 3 is a diagram showing the structure of a database in an auxiliary memory unit in an information processor having an electronic mail function in accordance with the present invention.

[0038] FIG. 4 is a diagram showing the configuration of electronic mail data.

[0039] FIG. 5 is a diagram showing an electronic mail data dividing method executed by a sending mail dividing means in the information processor having an electronic mail function in accordance with the present invention.

[0040] FIG. 6 is a diagram showing the structure of a mail dividing information file in the information processor having an electronic mail function in accordance with the present invention.

[0041] FIG. 7 is a flowchart showing electronic mail sending processing executed by an electronic mail processing program in order to realize the information processor having an electronic mail function in accordance with the present invention.

[0042] FIG. 8 is a functional block diagram showing means realized by executing an electronic mail processing program for performing receiving processing of electronic mail in the information processor having an electric mail function in accordance with the present invention.

[0043] FIG. 9 is a flowchart showing electronic mail receiving processing executed by an electronic mail processing program in order to realize the information processor having an electronic mail function in accordance with the present invention.

[0044] FIG. 10 is a diagram showing the inner structure of a divided mail storing unit in the information processor having an electronic mail function in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0045] An embodiment of the present invention will be described with reference to the drawings.

[0046] FIG. 1 is a block diagram showing an embodiment of an information processor having an electronic mail function in accordance with the present invention. Referring to FIG. 1, the reference character 1 identifies a CPU (central processing unit) for performing various kinds of functions to be described later by

executing a program and for controlling various kinds of units. The reference character 2 identifies a ROM (read-only memory) for storing the above-mentioned program. The reference character 3 identifies a RAM (random access memory) for storing data used when an application program and the above-mentioned program are executed. The reference character 4 identifies a display unit for displaying a result of executing the programs or a mail message. The reference character 5 identifies a communication unit for sending and receiving mail data through a communication network. The reference character 6 identifies an input/output unit for inputting a mail message and for inputting information to control the various units. The reference character 7 identifies an auxiliary memory unit, such as a hard disk unit, for storing the programs, electronic mail data to be sent or received and other necessary information generated in the information processor. An electronic mail processing program is pre-stored into the ROM, or is read from a recording medium such as a compact disk or a floppy disk, and then stored in the auxiliary memory unit 7.

[0047] FIG. 2 is a functional block diagram showing means realized by executing an electronic mail processing program for sending electronic mail using the CPU 1 in the information processor having an electric mail function in accordance with the present invention, which provides various functions from the inputting of a mail sending request through the input unit 6 to the sending of mail. When the size of electronic mail to be sent is smaller than an upper limit value, the electronic mail is sent in the same manner as in a conventional processor without any special processing. Therefore, the discussion of such a case is omitted.

[0048] As a request for sending mail is input from the input unit 6, a mail

size comparing means 8 acquires a mail size upper limit value corresponding to the destination of the mail from a mail size upper limit value storing part 10, using a mail size upper limit value switching means 9, and compares the size of the mail being sent with the mail size upper limit value. The mail size upper limit value is pre-stored in the mail size upper limit value storing part 10 by a mail size upper limit value input means in accordance with the mail size upper limit value of the destination database.

[0049] When the size of the mail to be sent exceeds the mail size upper limit value, the mail data is divided into a plurality of divided mail items (sub-mail sections), each having a size smaller than the mail size upper limit value, by a mail dividing means 11. At that time, a process of storing mail dividing information, which is necessary for reconstituting the plurality of divided mail data items to a form of a single original item of sent mail, is also performed.

[0050] Next, a mail dividing information adding means 13 performs a processing for adding mail dividing information stored in the mail dividing information storing means 12 to each of the divided mail sections, which have been divided by the mail dividing means 11. Then, a mail sending means 14 sends each of the divided mail data items to which the mail dividing information is added.

[0051] Here, each of the means shown in FIG. 2 will be described in more detail.

[0052] As shown in FIG. 3, personal information data, such as each electronic mail address, name, territorial address and so on is gathered in a card-form to be stored in the auxiliary memory unit 7, which serves as a database, and the mail size upper limit value storing part 10 is formed as a part of each personal information data

card 7a in the database to store the mail size upper limit value. This database can be also used as an address book which is referred to when the destination of electric mail needs to be specified. Therefore, the mail size upper limit value switching means 9 is constructed so as to initially search the database using a destination address as a keyword, and to acquire a mail size upper limit value from the mail size upper limit value storing part 10 of the corresponding data card (destination-based information data) 7a.

[0053] The mail dividing means 11 and the mail dividing information adding means 13 will now be described. In this embodiment, the electric mail data is roughly classified into two parts, that is, a mail header part 15 and a mail main part 16, as shown in FIG. 4. The mail header part 15 includes data, such as a sender address, subject name, destination address, size and so on, and the mail main part 16 contains the text of the mail message and an attached file. Therein, the attached file also contains data-compression processed file data.

[0054] The mail dividing means 11 changes such electronic mail data to be sent into a form in which only the mail main part 16 is divided into a plurality of divided mail main parts (1) 171 to (n) 17n, and the mail header part 15 (151 to 15n) is attached to each of the divided main parts (1) 171 to (n) 17n, as shown in FIG. 5. Therein, a user can select a dividing method which minimizes the number of sub-mail sections, equalizes the size of the sub-mail sections or other schemes, which determine the number of divided sub-mail sections of the mail. At that time, in each of the mail header parts 151 to 15n, the size information based on the original mail header part 15 is replaced by a mail size value corresponding to each of the divided mail main parts (1) 171 to (n) 17n, which size information is added to the mail header parts 151 to 15n,

respectively. Further, the mail dividing information, which is used for reconstituting the plurality of divided sent mail data items, that have been divided as described above, is stored in the mail dividing information storing means 12.

[0055] Next, the mail dividing information adding means 13 converts the mail dividing information stored in the mail dividing information storing means 12 into a file format to form mail dividing information files 201 to 20n, and adds each of them to a corresponding one of the divided sent mail data items as an attached file of the sent mail. A certain extension capable of identifying the original file is added to the mail dividing information files 201 to 20n in order to identify them as the mail dividing information at the time of receiving the mail.

[0056] Each of the mail dividing information files 20 (201 to 20n) is constructed, as seen in Fig. 6, so as to contain fields indicating an identification code 21, a section sub-number 22, the total number 23 of sections, the total capacity 24 of the mail, and the capacity 25 of the divided mail section. The identification code 21 is a code specific to the original sent mail data before it is divided. By attaching the same identification code to all of the plurality of divided sent mail data items, which have been divided from a single mail data item, the divided sent mail data items are prevented from being mixed up with other mail data when the received divided mail data items are reconstituted to form the single original mail data, as it existed before being divided, at the receiver side. The sub-number 22 identifies the order in which the divided mail data items are sent when the divided received mail data items are reconstituted to form the single received mail data. The sub-number 22 is stored when the mail dividing information adding means 13 attaches the mail dividing information files 201 to 20n to

the sub-mail sections. Further, when the mail is divided using the above-mentioned means and is actually sent and received, a confirmation message is displayed on the display unit 4. The confirmation message indicates that the mail is divisionally being sent, or that the received mail has been divisionally sent.

[0057] The above-described construction involves processing in the case where an information processor having an electronic mail function on the receiver side comprises means for automatically reconstituting the plurality of divided received mail data items to obtain the single original form of the received mail data. Description will be made below concerning the processing employed in the case where the information processor having an electronic mail function on the receiver side does not comprise a means for automatically reconstituting the plurality of divided received mail data items to obtain the single original form of the received mail data.

[0058] Presence or absence of the divided mail reconstituting means in the information processor having the electronic mail function on the receiver side is judged by providing a divided mail reconstituting means presence/absence information area 18 in the database, as seen in FIG. 3, and by inputting and pre-storing the presence/absence information into the area 18. The divided mail reconstituting means presence/absence information is input via the input unit 6.

[0059] When electronic mail is sent, the mail dividing information adding means 13 judges, by referring to the divided mail reconstituting means presence/absence information, whether or not the information processor at the mail destination has a divided mail reconstituting means. If the information processor at the mail destination does not have a divided mail reconstituting means, the mail dividing information adding

means 13 adds a divided mail reconstituting program, for executing divided mail reconstituting processing, as an attached file to each of the divided mail sections together with each of the mail dividing information files 201 to 20n, respectively.

[0060] Further, the subject name of the divided mail is changed corresponding to the information stored in each of the mail dividing information files 201 to 20n. For example, in a case where the subject name of the mail before being divided is "Re: holding a meeting", the subject name of the divided mail is changed to "Re: holding a meeting (M/N)" (where M is sub-number 22, and N is the number of mail divisions). In addition, at the same time, a sentence notifying the receiver that the mail is divided and sent is attached to the mail main part. In this way, when an information processor not having means for automatically reconstituting divided mail receives divided mail, it is possible to avoid confusion caused by successively receiving a plurality of electronic mail sections having the same subject name from a single information processor.

[0061] FIG. 7 is a flowchart showing the electronic mail sending processing executed by an electronic mail processing program in order to realize the information processor having an electronic mail function as described above.

[0062] Processing Step S701:

A mail sending request is input from the input unit 6.

[0063] Processing Step S702:

The database is searched using a destination address as a keyword to acquire a mail size upper limit value from the mail size upper limit value storing part 10 of the corresponding data card (destination-based information data) 7a.

[0064] Processing Step S703:

The size of the mail message to be sent is compared with the mail size upper limit value, and the processing is branched to the processing step S704 or the processing step S711 depending on the comparison result, i.e., large or small.

[0065] Processing Step S704:

The mail data is divided into a plurality of divided mail sections having a size smaller than the mail size upper limit value.

[0066] Processing Step S705:

The mail dividing information necessary upon receiving the plurality of divided sent mail data sections for reconstituting them to the single original form of mail data is stored in the mail dividing information storing means 12.

[0067] Processing Step S706:

The mail dividing information file is attached to each of the divided mail sections.

[0068] Processing Step S707:

It is judged by referring to personal information data for the mail destination whether or not the information processor at the destination of the electronic mail has a program for reconstituting the plurality of divided sent mail data sections to obtain the single original form of the mail data.

[0069] Processing Step S708:

The reconstituting program is attached to the divided mail as an attached file.

[0070] Processing Step S709:

The subject name of each of the divided mail sections is changed. The change of subject name is performed, for example, by adding "sub-number/number of divisions" to

the subject name of each mail section.

[0071] Processing Step S710:

A check is made to determine It is checked whether or not the change of subject name for all the divided mail sections is completed. If not, the processing is returned to the processing step S709.

[0072] Processing Step S711:

Each of the divided mail data sections is sent.

[0073] FIG. 8 is a block diagram showing a functional means realized by executing an electronic mail processing program for performing receiving processing of electronic mail in the information processor having an electric mail function on the receiver side, and shows the functional means for performing operations from receiving electronic mail to notifying the user of the receipt of electronic mail.

[0074] As a mail receiving means 26 receives electronic mail, a divided mail processing means 27 judges whether or not the received electronic mail data is divided mail. Therein, if it is judged that the received electronic mail data is divided mail, each of the received electronic mail sections is stored in a divided mail storing unit 28. This process is repeated until all the divided mail sections are received. When it is judged that all the divided mail sections have been received, each of the received items of the divided received mail data is stored in a received mail storing unit 29, and notification of the receipt of mail is displayed on the display unit 4.

[0075] The divided mail processing means 27 will be described below with reference to FIG. 9 and FIG. 10. FIG. 9 is a flowchart showing the flow of processing executed by an electronic mail processing program in order to realize the

divided mail processing means 27. FIG. 10 is a view showing the inner structure of the divided mail storing unit.

[0076] Processing Step S901:

It is judged whether or not electronic mail data is received.

[0077] Processing Step S902:

It is judged whether or not a file is attached to the received electronic mail, and the processing is branched to the processing step S903 or the processing step S911 depending on the result, i.e., presence or absence of an attached file.

[0078] Processing Step S903:

It is judged by referring to an extension added to a file name of the attached file whether or not the attached file is a mail dividing information file 20, and the processing is branched to the processing step S911 or the processing step S904 depending on the form of the attached file.

[0079] The processing steps S902 and S903 are mail dividing information judging steps for judging whether or not mail dividing information is appended to the received mail data, and forms a mail dividing judging means.

[0080] Processing Step S904:

The mail dividing information file 20 is opened, and the identification code 21 is read.

[0081] Processing Step S905:

A search is made to determine if the identification code 21 of the read file exists in a storing area of the divided mail storing unit 28, and it is judged whether or not receipt of the divided mail data has been completed. The processing is branched to

processing step S906 or processing step S908 depending on the judged result.

[0082] Processing Step S906:

If files having the specified identification code 21 have not been previously received, a mail storing area for a specified total capacity 24 of mail carrying this identification code 21 is secured in the divided mail storing unit 28.

[0083] Processing Step S907:

As shown in FIG. 10, the identification code 21, the number of mail divisions 23 and the total capacity 24 of the mail are stored in the divided mail storing unit 28. The numeral "0" is set to the number of divided mail receiving times 30.

[0084] Processing Step S908:

The mail main part of the divided mail, which has been received, is stored in the mail storing area in relative position indicated by the sub-number 22 specified in the header of the received mail section.

[0085] Processing Step S909:

The number of divided mail receiving times 30 is incremented by 1.

[0086] Processing Step S910:

By comparing the number of mail divisions 23 with the number of divided mail receiving times 30, it is judged whether or not all of the divided mail sections have been received, and the processing is branched to the processing step S901 or the processing step S911 depending on the judged result.

[0087] The processing step S910 is a divided mail receiving judging step, and forms the divided mail receiving judging means.

[0088] Processing Step S911:

The data below the mail header part 15 in the divided mail storing unit 28 is transferred to the received mail storing unit 29.

[0089] The processing steps S907 to S909 and S911 are mail reconstituting processing steps for reconstituting the plurality of divided mail data sections, which have been received, to obtain the original single form of mail data, and form a mail reconstituting means.

[0090] Processing Step S912:

The receipt of mail is indicated using the display unit 4.

[0091] Since the present invention is constructed as described above, it is possible to realize an information processor having an electronic mail function which can easily send and receive electronic mail to which a large-sized file is attached, and to realize a recording medium for recording an electronic mail processing program for the information processor.